User Manual

Tobii® Technology

Tobii T60 XL Eye Tracker

Revision 2

tobii
www.tobii.com

On Safety

Read this manual carefully before connecting and using the eye tracker

The Tobii T60 XL Eye Tracker is intended only for use in office and home environments.

Do not open the eye tracker!

Non-compliance will result in loss of Warranty! There are no user serviceable components inside and the risk of electric shock is high due to the presence of Dangerous High Voltages. Contact Tobii support if your eye tracker is not working properly.

Safety of NIR illumination from the Tobii T Series Eye Trackers

The illuminators of the Tobii T60 XL Eye Trackers have been tested at ETL SEMKO, Stockholm, according to IEC/EN 60825-1/A1-A2. The test has shown that the products comply with the standard for IEC/EN 60825-1/A1-A2 class 1 LED products intended to be used for long time exposure.

The standard IEC/EN 60825-1/A1-A2 states an Accessible Emission Limit (AEL) for continuous long time exposure. This limit is the maximum illumination that a person should be exposed to for eight hours a day many days in a row.

The products are intended to be used by a subject at a distance of approximately 60 cm from the eye tracker. At the regular user distance the exposure, averaged over time, of light from the Tobii T60 XL Eye Tracker to the subject sitting in front of it is 0.1 % of the allowed limit for long time exposure according to IEC/EN 60825-1/A1-A2 class 1 LED products.

Epilepsy warning

Some people with Photosensitive Epilepsy are susceptible to epileptic seizures or loss of consciousness when exposed to certain flashing lights or light patterns in everyday life. This may happen even if the person has no medical history of epilepsy or has never had any epileptic seizures.

Such people may have a seizure while watching certain images or patterns on a monitor, or even when exposed to the light sources of an eye tracker. It is estimated that about 3-5% of people with epilepsy have this type of photosensitive epilepsy.

Declaration of Conformity

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules and EMC directive 2004/108/EG. The product also conforms with the directive 73/23/EEC for low voltage and environmental directives 2002/95/EC and 2002/96/EC.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CE

All Tobii Eye Trackers are CE-marked, indicating conformity with the essential health and safety requirements set out in European Directives.

Table of Contents

- **Quick Start 4**
- First time usage 4
- Components checklist 4

- **Product Care 5**

- **Connecting Tobii Eye Tracker 7**
- Setting up the connection to your computer 7
- Installing the USB Ethernet Adapter 7
- Installing the USB User Camera Driver 7
- Installing eye tracker software 7
- Setting up the network connection to the eye tracker in Windows 8
- Connecting to the eye tracker in Tobii Studio 10
- Connecting to the eye tracker in ClearView or Tobii SDK 10
- Setting the IP address in ClearView 11

- **Configuration and settings 12**
- General setup guidelines 12
- Setup example 12
- Minimum system recommendations 13

- **Parts and Controls 14**
- Front display 14
- Left side panel - connections 14
- Left side panel - controls 15
- Right side panel - power 16
- Mounting the Tobii T60 XL on an alternative foot 16

- **Customizing the Eye Tracker's Display 17**

- **Appendix I: Eye Tracker Upgrade 21**
- Eye tracker software upgrade 21

- **Appendix II: Troubleshooting Guide 22**
- Problems with the Apple Bonjour Service 22
- Problems with the peer-to-peer network configuration 23

- **Appendix III: Technical Specifications 24**
- Tobii T60 XL Eye Tracker 24
- Glossary - technical specifications 25
- Eye tracker data output 26

Tobii T60 XL Eye Tracker User Manual

This document contains information proprietary to Tobii Technology AB . The contents are confidential and any disclosure to persons other than officers, employees, agents or subcontractors of the owner or licensee of this document, without the prior written consent of Tobii Technology AB, is strictly prohibited. No part of this publication may be reproduced, stored in retrieval system, or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, without the prior consent of the copyright holder.

Manual release 2.0, October 2010

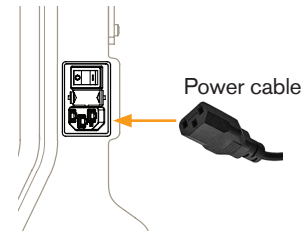
Tobii Technology AB reserves the right to change the content of this manual without prior notice. Changes due to typographical errors, inaccuracies or modifications in programs and/or equipment might be implemented at any time. Please check the Tobii web site www.tobii.com for updated versions of this document.

All rights reserved.

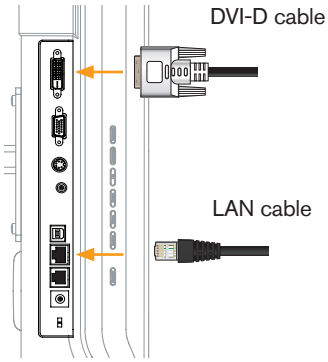
© Tobii Technology AB

Quick Start

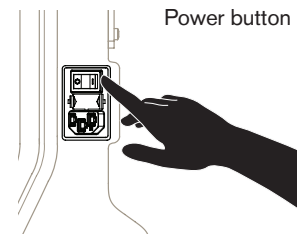
Step 3. First time usage



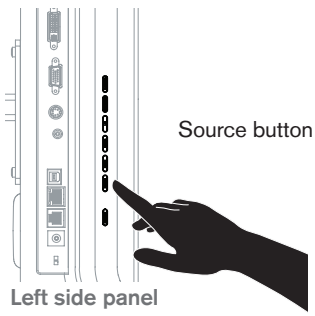
Right side panel



Left side panel



Right side panel



Left side panel

First time usage

1. **Configure the network card**

   Install and configure the separate USB Ethernet adapter, configure the built in network card in your computer, your network router, or your office LAN. For complete details see pages 7-8.

2. **Install the eye tracker software**

   Install Tobii Studio or Tobii Eye Tracking Tools. For complete details see page 7.

3. **Connect the eye tracker to your computer**

   Connect the Power, DVI and LAN cables and turn on the eye tracker by pressing the power button. Press the Source button to choose the input mode (Digital). See figures on the left. For details on connecting the User Camera and Built-in Speakers read page 7.

4. **Reboot your computer**

5. **Connect the eye tracker to Tobii software**

   Start Tobii Studio or other supported software and make sure the eye tracker is connected. For complete details see pages 8-10.

6. **Adjust your physical setup**

   Adjust the physical setup of the eye tracker and other devices. For details see page 11.

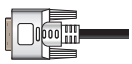
7. **Create your Project and Tests in Tobii Studio**

   For details read chapter 4 of the Tobii Studio User Manual.

8. **Calibrate and record in Tobii Studio**

   For details read chapter 4 of the Tobii Studio User Manual.

Component checklist

- **Tobii T60 XL Eye Tracker**
- **Computer with Tobii Studio or other supported software**
  (Download the Tobii System Recommendations document from www.tobii.com)
- **Tobii Studio or Tobii T/X Series Eye Trackers Resources CD**
- **Power supply cable**
- **DVI-D cable** 
- **LAN cable**
- **USB - LAN Adapter**
- **Audio Cable**
- **User Camera USB Cable A/B**

Product Care

Temperature and humidity

Do not place the eye tracker in places subject to extreme temperatures and humidity, such as on top and or near a heating element, or in a damp room.

Do not expose the eye tracker to direct sunlight. Failure to comply may lead to equipment damage due to high temperature exposure.

The recommended range of temperatures and humidity values are:

Storage temperature: 0°C to +35°C / 32°F to 95°F
Storage humidity: Max. 70%, no condensation
Usage temperature: +20°C to +35°C / 50°F to 95°F
Usage humidity: Max. 80%, no condensation

Placement

Only use arms and stands specified by the supplier and make sure that they are mounted and fastened correctly according to the instructions. Do not place the eye tracker on unstable and uneven surfaces.

Avoid places subject to strong mechanical vibrations or shock. The eye tracker should not be operated on moving vehicles.

Do not cover the ventilation openings of the eye tracker. If these openings are covered built up heat may cause failure and a possible fire hazard.

Ingress protection

IP class 20. No protection against objects smaller than 3.5mm.

Do not place the monitor in places with large amounts of dust, dirt or sand, for example, near an open window or an outdoor exit.

If setting up temporarily in an outdoor location take adequate precautions against airborne dust and dirt.

Do not use the eye tracker near water. The eye tracker is not water resistant.

Mechanical shock

If the eye tracker is exposed to mechanical shock, for example, when dropped, do not try to connect it to a power source. Contact Tobii support.

Power

It is recommended that you connect the power cable of the eye tracker and computer to an outlet with a protective earth/ground connection.

Use an accessible outlet and make sure that the cables are properly placed to avoid a possible trip hazard.

Do not try to replace, repair or bypass a blown fuse. A blown fuse is an indication that there is a malfunction in the eye tracker, contact Tobii support to arrange for your equipment to be serviced.

Transportation

Disconnect all the cables and grasp the monitor with both hands when carrying it.

When you transport the eye tracker for repair, shipment or traveling, use the original casing and packing materials.

Cleaning

Before cleaning the eye tracker's monitor unplug the power cord from the power outlet. Only use products intended for screen cleaning. Avoid dripping liquids into the openings between the screen surface and the chassis as the eye tracker may be seriously damaged.

Eye tracker setup

For full functionality and best performance use computers that fulfill the Minimum System Requirements and third party equipment from the System Recommendations Tobii Studio document (available for download at www.tobii.com).

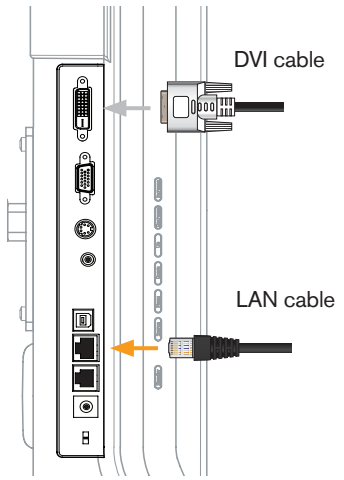
Make sure the network connection is set up according to the description in this manual. For a more robust connection use a peer-to-peer type of connection (Option A, page 10).

Disposal of the eye tracker

Do not dispose of the eye tracker in general household or office waste. Follow your local regulations for disposal of electrical and electronic equipment.

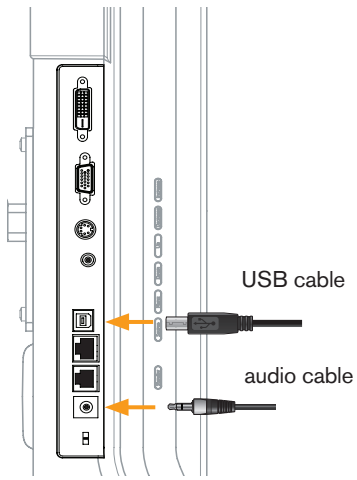
Connecting Tobii Eye Tracker

Option A & B. Eye tracker connectors



Left side panel

Connect the USB User Camera and the speakers (Audio in) to the computer if you wish to use the built-in user camera and audio speakers.



Left side panel

Setting up the connection to your computer

The eye tracker communicates with the computer via a standard network cable. Connect the eye tracker to your computer using the LAN cable (**LAN**). There are two different ways you can setup the communication between the eye tracker and your computer:

Option A

Connect the eye tracker directly to your computer by using the USB Ethernet adapter included (see installation instructions below) or by connecting the eye tracker to the built in network card in your computer. The network card must be configured in Windows to obtain an IP address automatically (see instructions on next page). Windows will say limited connectivity for the eye tracker LAN connection. This is correct, ignore the warning. Please note that if you connect the eye tracker directly to the built in network card in your computer you wont be able to access Internet unless you use an additional network card or a wireless network.

Option B

Connect the eye tracker directly to your office LAN or to a separate network Router. The office LAN or the Router must be configured to automatically give the eye tracker an IP address via DHCP. After properly being recognized by the office LAN or the Router the eye tracker can be accessed by any other computer on the same network running Tobii Studio, ClearView or Tobii SDK.

Installing the USB Ethernet Adapter

If you want to use setup **option A** explained above start by installing the USB Ethernet adapter on your computer. Plug the USB cable into an available USB port on your computer. Windows will detect new hardware and prompt you for the Drivers, which can be found on the Tobii T/X Series Eye Trackers Resources CD provided. Please follow the on screen instructions. For detailed instructions on driver installation, please refer to the network adapter manual on the CD.

Installing the USB User Camera Driver

Plug the USB cable into an available USB port on your computer. Windows will detect new hardware and prompt you for the Drivers, which can be found on the Tobii T/X Series Eye Trackers Resources CD provided with the eye tracker.

Installing eye tracker software

Install Tobii Studio, ClearView, Tobii SDK or other supported eye tracking software on the computer you intend to use. To install Tobii Studio just insert the Tobii Studio CD and follow the on screen instructions. Please refer to the Tobii Studio Manual for more information.

Using the eye tracker without Tobii Studio

If you will not be using Tobii Studio on your computer you must install the Tobii Eye Tracking Tools to be able to access and configure the eye tracker. The installation file called tobii-eye-tracking-tools-X.msi (where X is replaced with the version number of the software) can be found on the Tobii T/X Series Eye Trackers Resources CD provided. After installing the Tobii Eye Tracking Tools you can browse for the eye tracker by going to Start > All Programs > Tobii > EyeTracker Browser. If you install Tobii Studio on your computer the EyeTracker Browser is installed automatically.

Setting up the network connection to the eye tracker in Windows

If you connect the eye tracker directly to your computer by using the USB Ethernet adapter included or the built in network card in your computer, the network card in Windows must be configured to **obtain an IP address automatically**, on most computer this is the default setting. Please follow the instructions below to configure the network card.

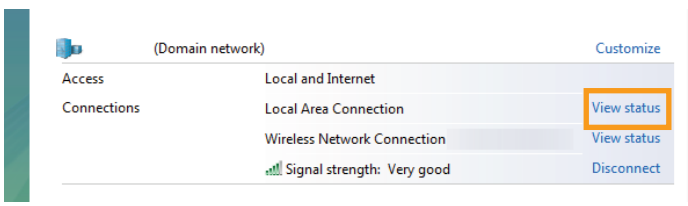
In Windows XP

1. Open the **Windows Control Panel**
2. Open **Network Connections**
3. Right click on the network card you will be using to communicate with the eye tracker. Choose **Properties.**
4. Select **Internet Protocol (TCP/IP)** then click on the **Properties** button. See 1st figure on the left.
5. Make sure that **Obtain an IP address automatically** is selected in the Internet Protocol (TCP/IP) Properties window. See 2nd figure on the left.
6. Click **OK** to close the windows and apply the settings.
7. Turn on and plug in the eye tracker to the network card and reboot your computer.

   Windows will say limited connectivity for the eye tracker network connection. This is correct, ignore the warning.

In Windows Vista

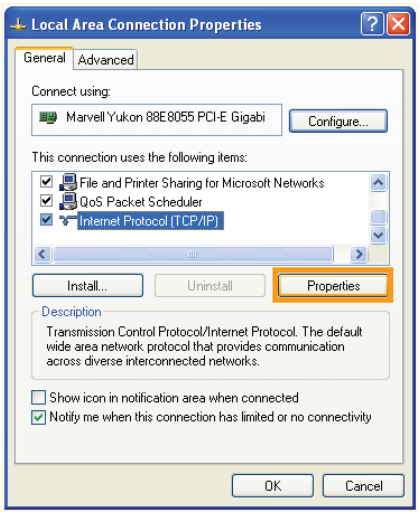
1. Open the **Windows Control Panel** (**Control Panel Home** view)
2. Click on **Network and Internet**
3. Open **Network and Sharing Center**
4. Click on the **View Status** link next to **Local Area Connection** (see figure below). The **Local Area Connection Status** dialog box will open.



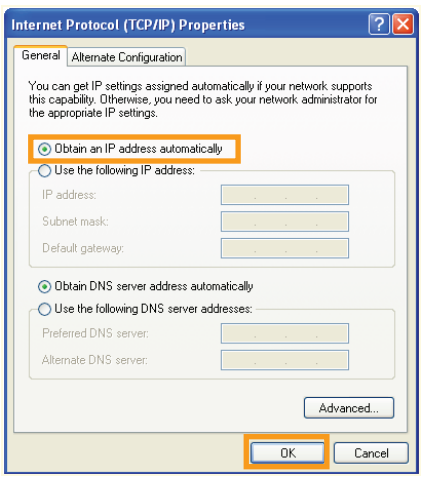
5. Click on the **Properties** button. The **Local Area Connection Properties** dialog box opens.
6. Under "This connection uses the following items", click **Internet Protocol Version 4 (TCP/IPv4)**, and then click on the **Properties** button. See 3rd figure on the left.
7. Make sure that **Obtain an IP address automatically** is selected in the Properties window. See 1st figure on the next page.
8. Click **OK** to close the windows and apply the settings.
9. Turn on and plug in the eye tracker to the network card and reboot your computer.

   Windows will say limited connectivity for the eye tracker network connection. This is correct, ignore the warning.

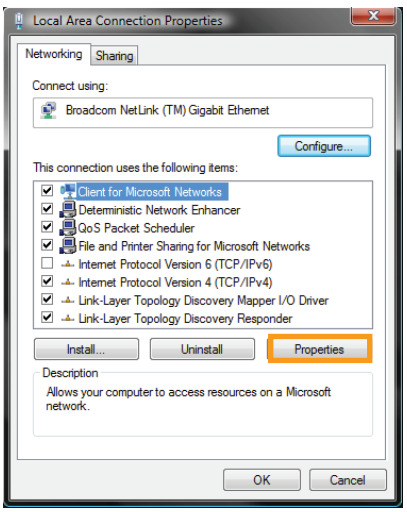
Windows XP Step 4.



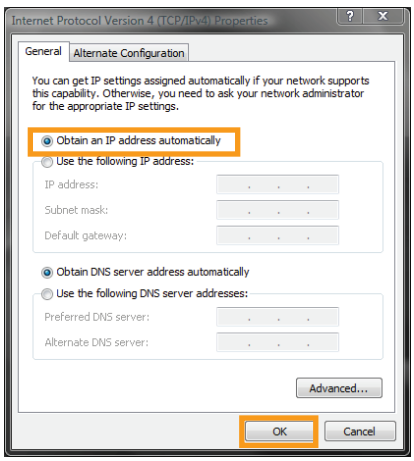
Windows XP Step 5 & 6.


Internet Protocol (TCP/IP) Properties
General
Alternate Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

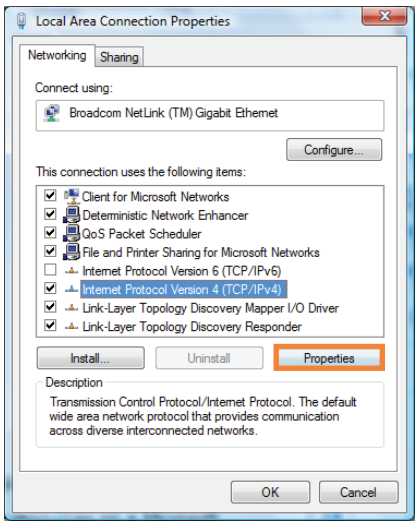
Windows Vista Step 6.



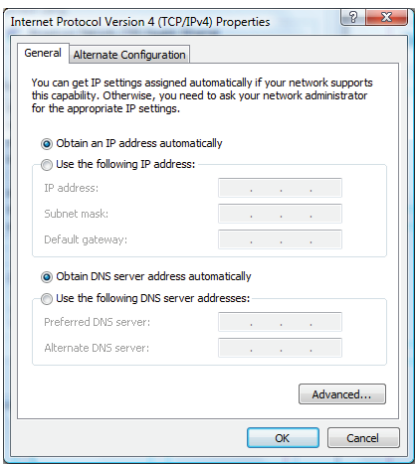
Windows Vista Step 7 & 8.


Internet Protocol Version 4 (TCP/IPv4) Properties
General
Alternate Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Windows 7 Step 6.

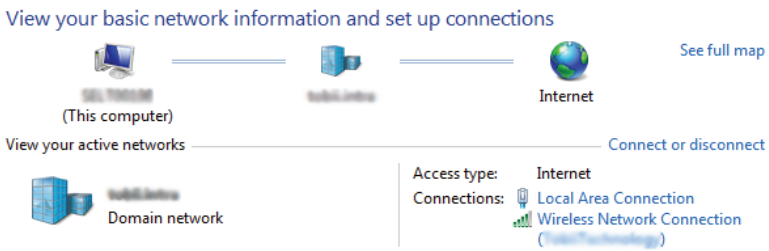


Windows 7 Step 7.


Internet Protocol Version 4 (TCP/IPv4) Properties
General
Alternate Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

In Windows 7:

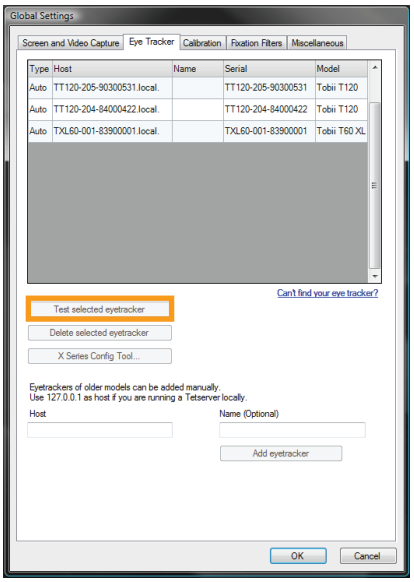
1. Open the Windows **Control Panel**
2. Open **Network and Sharing Center**
3. Click on the **Local Area Connection** link next to Connections: (see image below). The Local Area Connection Status dialog box will open.



4. Click on the **Properties** button.
5. Click 'Yes' in the dialog window that appears. This action requires an Administrator account on the computer. Consult your system administrator regarding local computer user permissions.
6. Under "This connection uses the following items", click **Internet Protocol Version 4 (TCP/IPv4)**, and then click on the **Properties** button.
7. Make sure that **Obtain an IP address automatically** is selected in the Properties window.
8. Click **OK** to close the windows and apply the settings.
9. Plug in the eye tracker to the network card you just configured and reboot your computer. Ensure the eye tracker is powered on before rebooting the computer.

   Windows will say limited connectivity for the eye tracker network connection. This is correct, ignore the warning.

Connecting in Tobii Studio Step 4.



Connecting to the eye tracker in Tobii Studio

The computer is connected to the Tobii T60 XL Eye Tracker in Tobii Studio using the instructions below. If connecting to the eye tracker with ClearView or other software see next page. Before using this part of the guide, Tobii Studio has to be installed.

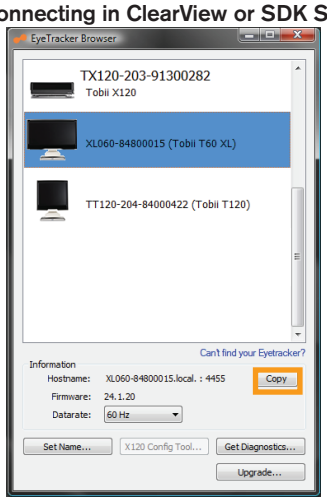
The first time Tobii Studio is opened it is possible to select the a Tobii T Series Eye Tracker and the eye tracker connection window will appear automatically, after that it has to be opened manually by following the instructions below. If this window appears imediately during at the software start go to step 3 below.

1. Go to the **Tools** menu in Tobii Studio and select **Settings**.
2. Click the **Eye Tracker** tab where the Tobii Eye Trackers found are listed. See figure.
3. **Select** the eye tracker to be used. The eye tracker name is similar to the serial number on the back of the eye tracker. When the eye tracker is selected the Tobii Studio software will automatically connect to the eye tracker.
4. The connection can be tested by clicking the **"Test selected eyetracker"** button. Make sure the connection status says **Connected**.

   If there are problems connecting to the eye tracker or if the connection appears slow, try rebooting your computer.

The connection status of the eye tracker can also be monitored in the **Tobii Studio Design & Record** view**.** Below the **Recording** button a status indicator shows if the eye tracker is connected or not. Click on the status indicator to open the **Eyetracker Selector** window**.**

Connecting in ClearView or SDK Step 2.



Connecting to the eye tracker in ClearView or Tobii SDK

The eye tracker is connected by setting the IP address in ClearView, Tobii SDK or other supported software. If Tobii Studio is not installed on your computer you must first install the Tobii Eye Tracking tools to be able to access and configure the eye tracker. The installation file called **tobii-eye-tracking-tools-X.msi** (where X is replaced with the version number of the software) can be found on the Tobii T/X Series Eye Trackers Resources CD.

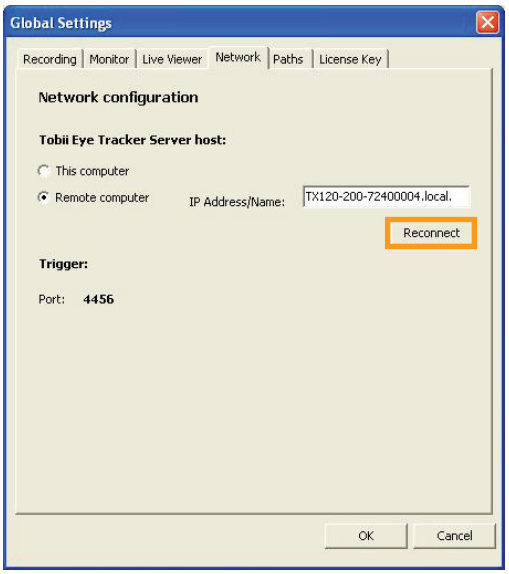
1. To open the Tobii EyeTracker Browser go to the windows **Start** > **All Programs** > **Tobii** > **Tobii EyeTracker Browse**r. The Tobii EyeTracker Browser window is displayed where all eye trackers found are listed.
2. **Select** the eye tracker to be used for testing. The hostname is shown in the information part of the window. This name is similar to the serial number on the bottom of the eye tracker.
3. Click on the **Copy** button to copy the eye tracker hostname, see 3rd figure on the left.

   If ClearView is used see the section "Setting the IP address in ClearView" below. The hostname can be used as IP-address in the SDK and other supported software. It is also possible to set the real IP-address.

Setting the IP address in ClearView

When using ClearView and T60 XL the IP-address has to be set manually in ClearView; see above how to copy the address.

1. In ClearView select **Settings** > **Global Settings** and click the **Network** tab
2. Check **Remote computer** and enter the IP address. Use the Tobii Eye Tracker Browser to get the IP address.
3. Click **Reconnect**.

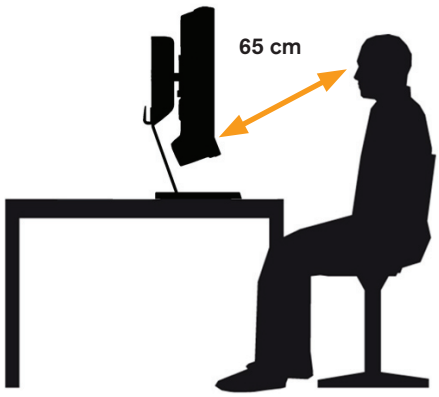


Configuration and Settings

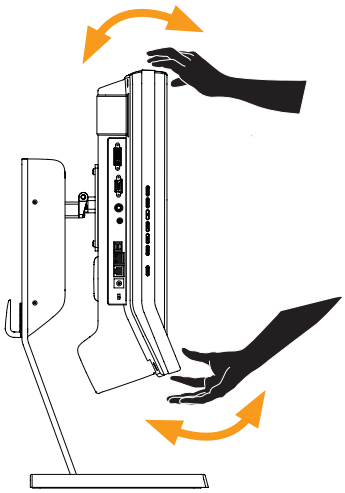
General setup guidelines

The distance from the person's eyes to the eye tracker should be approximate **~65 cm (25.6 inches)**. It is very important to have the **correct distance** to the screen otherwise the eye tracker cannot track the entire area. If the eye tracker is too close to the test subject there is a risk of losing some of the gaze data.

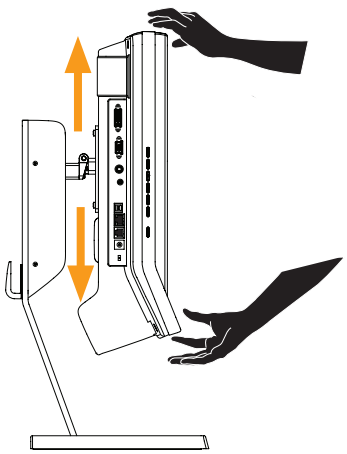
The eye tracker should be placed so that the gaze angle will not exceed **~42° to any point on the screen**.



Adjust tilt



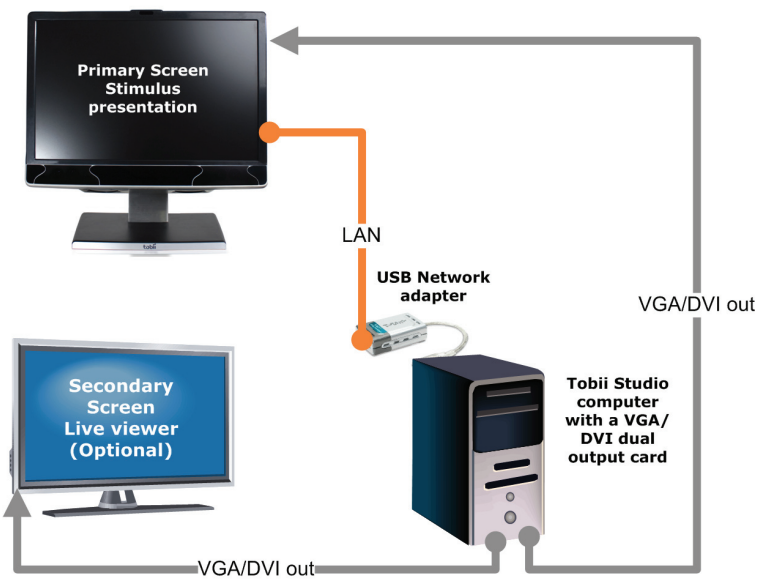
Adjust hight



Setup examples

Live Viewer setup

This setup requires Tobii Studio Professional or Enterprise version. When using the Tobii T60 XL Eye Tracker configure Windows to use the eye tracker's screen as the primary screen. An additional optional secondary monitor can be used for monitoring the eye movements during the recording by using the Live Viewer function in Tobii Studio. For this option the graphics card in the computer must support dual output.

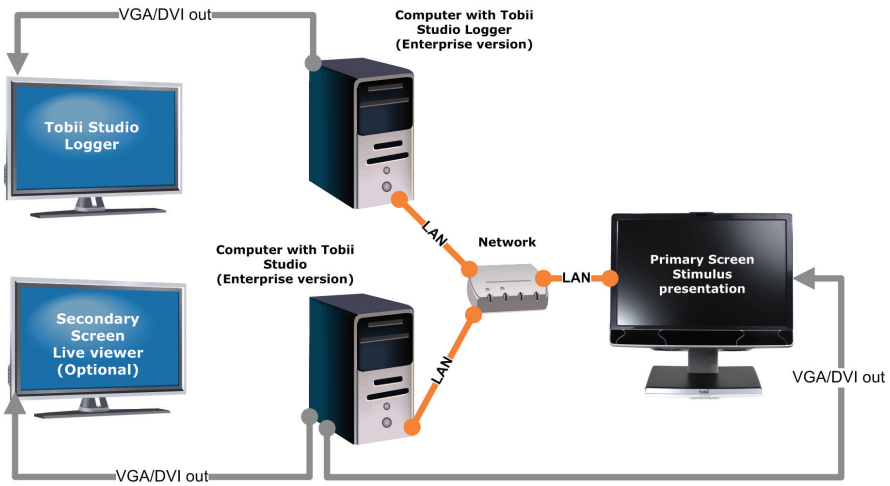


Remote Live Viewer

This setup requires Tobii Studio Enterprise version. This setup is used when the test should be supervised and/or controlled from one or more remote stations. It can be a computer in the next room where a supervisor is sitting and a computer connected to a wide screen for remote viewing for customers etc. In a lot of studies it is important to see the participant's reactions and record the conversation between test leader and test participant, as well as using think-aloud. In this case it is possible to use the built-in user camera and connect a microphone to record the participant's image and sound..

An alternative to using the adapter in the setup drawing is to connect the eye tracker to a local network, see more under the single screen setup option.

To get a portable lab replace the computer in the setup drawing with a laptop or shuttle computer. For Tobii Studio more than one remote viewer can take part of the testing.



Minimum system recommendations

A list with the minimum system recommendations for components that can be used together with Tobii studio is also available, please visist www.tobii.com or contact your Tobii sales representative if you wish to download or receive it.

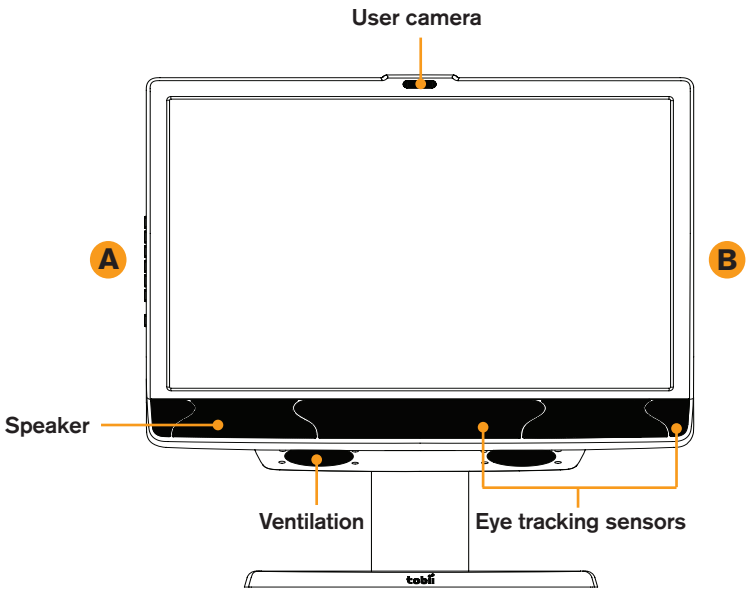
Parts and Controls

Equipment list

- Tobii T60 XL Eye Tracker
- Tobii Studio or Tobii T/X Series Eye Trackers Resources CD
- Tobii T60 XL Eye Tracker User Manual
- Power supply cable
- DVI-D cable (2.0 m)
- VGA cable (1.8 m)
- Audio Cable (3.5 mm, 1.8 m)
- LAN Cable (3.0 m)
- USB Cable A/B
- USB - LAN Adapter
- T60 XL flight case

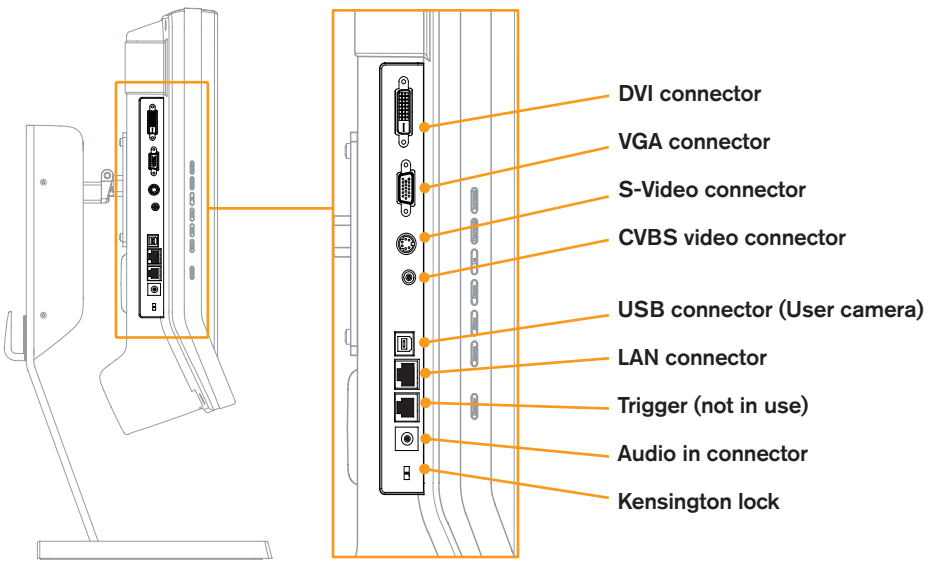
Front display

The Tobii T60 XL Eye Tracker has built-in speakers and a user camera placed at the front. The power plug and power switch are located on the right side panel of the eye tracker (**B**), the remaining connections and control buttons are located on the left side panel of the eye tracker (**A**).



A Left side panel - connections

The VGA/DVI display and network connections can be found on the left side panel of the eye tracker.



Left side panel - connections (cont.)

DVI connector - connect to the digital video output (DVI-D) on your computer or video equipment.

VGA connector - connect to the VGA output on your computer or video equipment.

S-Video connector - connect to the S-Video output on your computer or video equipment. Use only to display the image on the screen, to record an image from a S-Video source in Tobii Studio the connection must be splitted to a video capture card on the computer running Tobii Studio.

CVBS video connector - connect to the composite video output on your computer or video equipment. Use only to display the image on the screen, to record an image from a CVBS-Video source in Tobii Studio the connection must be splitted to a video capture card on the computer running Tobii Studio.

User camera - connect the built-in user camera to the USB port on your computer. The driver for the camera can be found in the Tobii Studio or Tobii Eye Tracker Tools CD.

LAN connector - connect to the eye tracker to your computer using a LAN cable.

Trigger - trigger communication port, this function is currently unavailable.

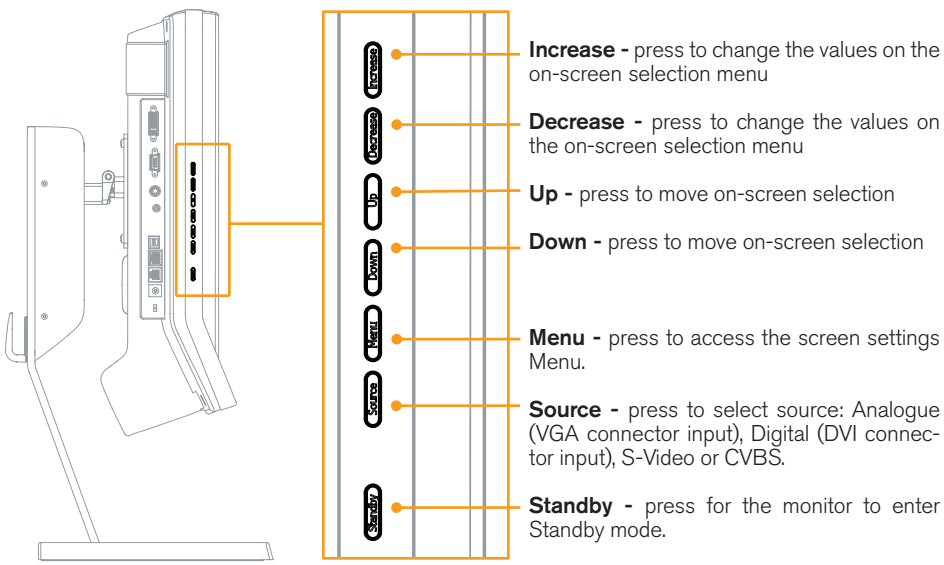
Audio in connector - connect to the audio output on your computer. Use an audio cable with 3.5 mm stereo jack. To change the volume of the speakers use the computer sound control in Windows.

Kensington lock - connect the eye tracker to a Kensington security cable. Secure the eye tracker by wrapping the steel cable around an immovable object, inserting the lock into the Kensington security slot, and turning the key.

Note: Most laptops only support VGA while DVI provides a higher quality output. If the study contains images with high detail and stored in an high definition format we recommend to use a laptop with a DVI connector.

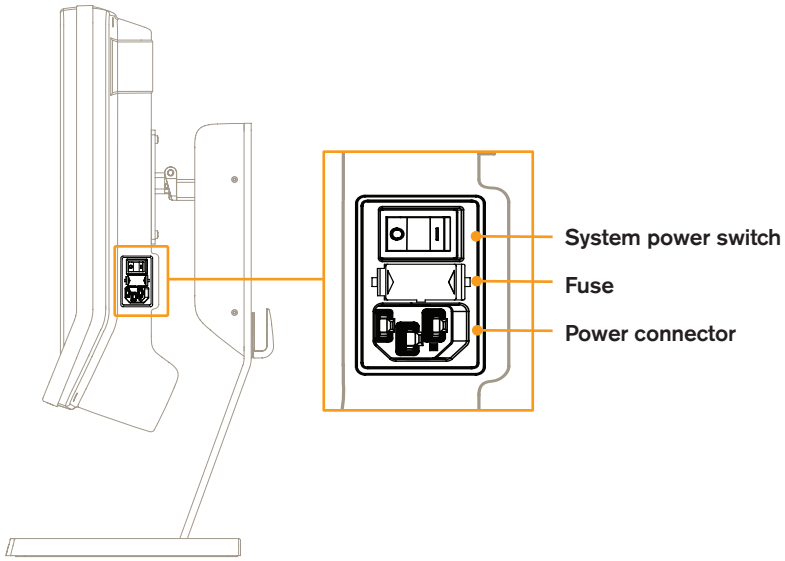
A Left side panel - controls

Input image source, screen and sound settings can be accessed on the panel located on the left side of the eye tracker.


Increase
Decrease
Up
Down
Menu
Source
Standby
Increase - press to change the values on the on-screen selection menu
Decrease - press to change the values on the on-screen selection menu
Up - press to move on-screen selection
Down - press to move on-screen selection
Menu - press to access the screen settings Menu.
Source - press to select source: Analogue (VGA connector input), Digital (DVI connector input), S-Video or CVBS.
Standby - press for the monitor to enter Standby mode.

B Right side panel - power

The AC IN connector and the system power switch can be found on the right side panel of the eye tracker.



System power switch - press to turn the eye tracker unit on (**I**) or off (**0**) . If you only wish to turn off the screen then press the Standby button located on the left side panel of the Eye Tracker (see opposite page).

Fuse - location of the main fuse (3.15 A). Do not try to replace, repair or bypass a blown fuse, instead contact Tobii Support.

Power connector - connect the power cable to a standard power socket (110 or 240 AC).

Mounting the Tobii T60 XL on an alternative foot.

The eye tracker can be mounted on a Ergotron MX LCD arm. We recommend that you use the desk mount arm together with the adapter supplied by Tobii (VESA 100, M4 x10mm). For more information contact Tobii Technical Support (support@tobii.com).

The installation manual for the Ergotron MX LCD arm can be downloaded from the following link: http://www.ergotron.com/Portals/0/tp/G/MX/888-45-155-W.pdf

Customizing the Eye Tracker's Display

OSD menu

The monitor settings can be adjusted on the on-screen display menu (OSD). To display the main OSD menu press the **Menu button** located on the left side of the eye tracker. For best results it is recommended that you turn on the monitor and wait for 30 minutes before making the adjustments.

Navigating the menu

Press the Menu button to display the main OSD menu on your screen. Use the **Up** and **Down** and **Menu buttons** to select the different sub-menus.

Using the Menu, Up and **Down buttons**

1. Display the main OSD menu
   Press the **Menu button** to display the main menu on the screen
2. Select the feature you want to adjust
   Press the **Up and Down buttons** to display the desired sub-menu. Press the **Menu button** to select a sub-menu.
3. Adjust the menu
   Press the **Up and Down buttons** to make the adjustment, then press **Menu button**. When you press the **Menu button** the settings are stored and the display returns to the previous menu.
4. Close the menu
   Press the **Menu button** several times to exit the menu and return to normal viewing.

Adjusting the screen image

Press the **Menu button** to display the **Image menu**. Use the **Up** and **Down buttons** to navigate on the menu, and **Menu button** to select or change the settings.

Brightness
Adjust the brightness of the screen

Contrast
Adjust the ratio of luminance between black and white, adjusts distinction

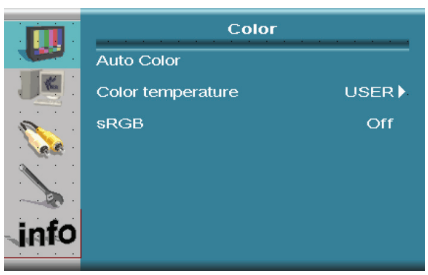
Hue
Adjust the RGB luminance gain

Saturation
Adjust the color intensity of the screen

Sharpness
Adjust to sharpen or soften the picture

Color
Enter the **Color Adjustment Menu**

Adjusting the color



Press the **Menu button** to display the main menu, then press the button again to enter the **Image menu**. Use the **Up** and **Down buttons** to navigate on the menu. Highlight the **Color** option and press the **Menu button**.

Auto Color
Sets the RGB color balance automatically from the input signal

Color temperature
Enter the **User Menu** (White color adjustment)

sRGB
Choose to use sRGB (standard RGB) as the color space of the monitor

Color temperature User menu

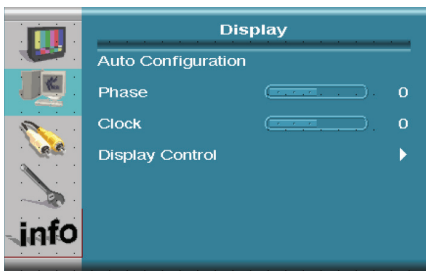
Highlight the **Color temperature** option and press the **Menu button**.

Red
Adjust Red value of color temperature

Green
Adjust Green value of color temperature

Blue
Adjust Blue value of color temperature

Adjusting the display settings



Press the **Menu button** to display the main menu. Use the **Up** and **Down buttons** to navigate on the menu and show the **Display Menu.**

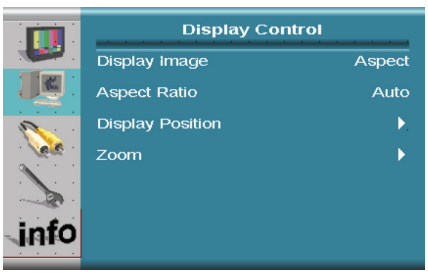
Auto Configuration
Executes an auto adjustment for phase, clock and position (factory settings).

Phase
Adjust the phase of the screen. Only adjust when noise or overlapped lines are shown on the screen.

Clock
Adjust the horizontal size of the screen by increasing or decreasing the number of picture elements. Only adjust this setting if you have an horizontally unmatched picture after doing an auto adjustment.

Display Control
Enter the **Display Control menu.**

Display Control menu



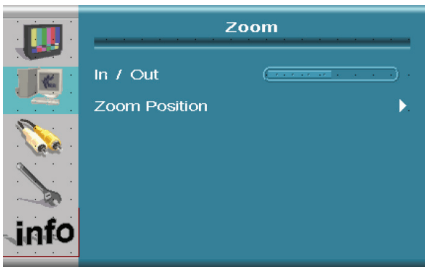
Highlight the **Display Control menu** and press the **Menu button**.

Display Image
Select various modes of screen display

Aspect Ratio
Select display output aspect ratio

Display Position
Enter the **Display Position Menu** by pressing the **Menu button**. Use the **Up, Down, Increase and Decrease buttons** to choose the direction and the **Menu button** to confirm the display's position.

Zoom
Enter the **Zoom Menu**



Adjusting the Zoom

Highlight the **Zoom menu** and press the **Menu button**.

In/Out
Adjusts zoom-in and zoom-out range

Zoom Position
Enter the **Zoom Position menu** by pressing the **Menu button**. Use the **Up, Down, Increase and Decrease buttons** to choose the direction and the **Menu button** to confirm the zoom's position.

Pip (picture in picture) menu

Press the **Menu button** to display the main menu, . Use the **Up** and **Down buttons** to navigate on the menu and show the **Pip Menu.**

Pip
Turns the Pip feature on or off

Pip Size
Adjust the size of the picture

Pip Position
Enter the **Pip Position menu** by pressing the **Menu button**. Use the **Up, Down, Increase and Decrease buttons** to choose the direction and the **Menu button** to confirm the picture's position.

Pip Color Controls
Enter the **Pip Color Controls menu.**

Blend
Adjust Pip screen blending level

Pip Color Controls menu

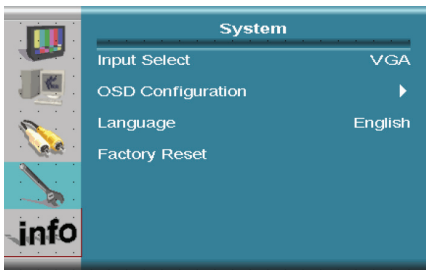
Brightness
Adjust to brighten or darken the picture

Contrast
Adjust the ratio of luminance between black and white, adjusts distinction

Hue
Adjust the RGB luminance gain of the picture

Saturation
Adjust the color intensity of the picture

System menu



Press the **Menu button** to display the main menu. Use the **Up** and **Down buttons** to navigate on the menu and show the **System Menu.**

Input Select
Select the imput source for the image

OSD Configuration
Enter the **OSD Configuration Menu** by pressing the **Menu button**.

Language
Select the OSD language

Factory Reset
Change all settings to factory set values

OSD Configuration menu

Highlight the **OSD Configuration Menu** and press the **Menu button**.

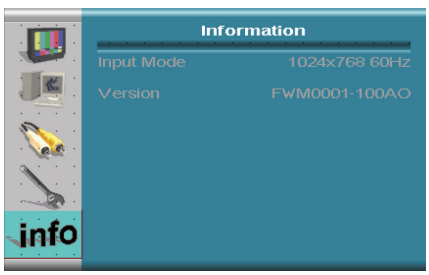
OSD Timer
Adjust the view time of the OSD menu.

OSD Position
Enter the **OSD Position menu** by pressing the **Menu button**. Use the **Up, Down, Increase and Decrease buttons** to choose the direction and the **Menu button** to confirm the menu's position.

OSD Transparency
Adjusts the opacity of the menu.

OSD Zoom
Choose to allow zooming on the OSD

Information tab



Press the **Menu button** to display the main menu. Use the **Up** and **Down buttons** to navigate on the menu and show the **Information tab.**

Input Mode
Displays information on the input source

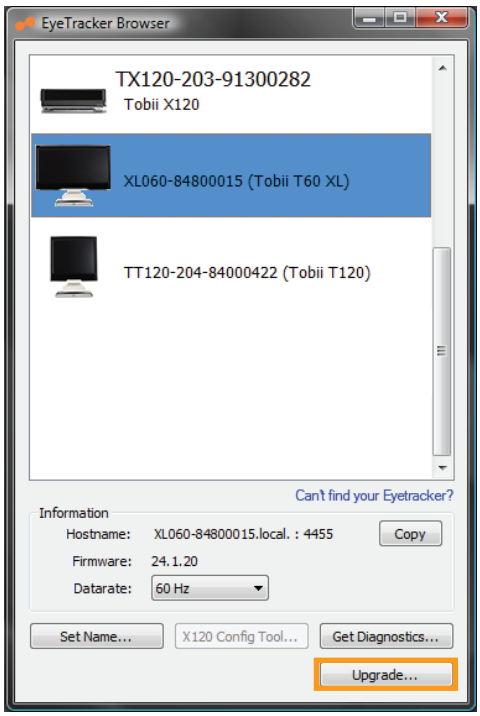
Version
Displays information on the screen's controler firmware

Appendix I: Eye Tracker Upgrade

Eye tracker software upgrade

Follow the instructions below to upgrade the eye tracker software.

1. Open the Tobii EyeTracker Browser, found under **Start > All Programs > Tobii.**
2. In the Tobii EyeTracker Browser mark the eye tracker that is to be upgraded.
3. Click the **Upgrade button**.
4. Browse to the folder where the upgrade files are saved.
5. Select the upgrade file with the file extension **.tobiipkg** and click **OK**.
6. A message stating that the upgrade is finished should appear. Click **OK** to close.



Appendix II: Troubleshooting Guide

The Tobii T60 XL Eye Tracker uses a network connection to communicate with the computer. This guide helps you to troubleshoot the most common connection issues with your Tobii Eye Tracker.

Note: This guide assumes that the tracker in question has firmware 1.2.x or higher installed, and that the latest Tobii Studio or Tobii Eye Tracking Tools is installed on the computer.

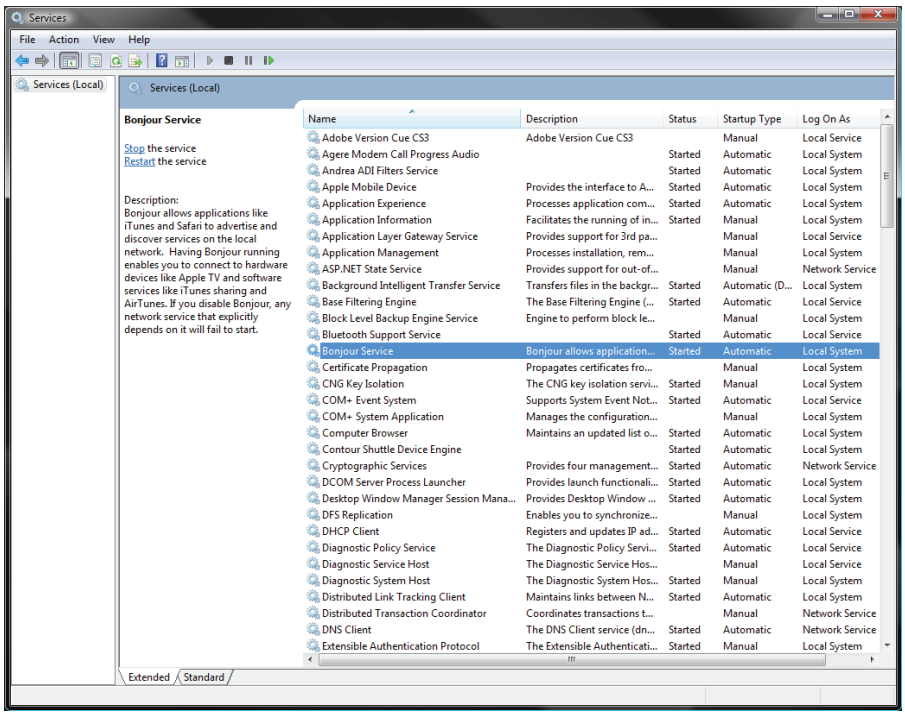
Problems with the Apple Bonjour Service

The Apple Bonjour service is used by the Tobii Eyetracker Browser and Tobii Studio to identify the eye trackers that are connected to the same network as the computer. The service is installed automatically with Tobii Studio and the Tobii Eye Tracking Tools.

1. **The Apple Bonjour Service is not installed on the computer.**

   Check if the service is installed on the computer:

   Open the **Windows Control Panel** (**Classic View**) > **Administrative Tools** > **Services**.


Services
File Action View Help
Services (Local)
Bonjour Service
Stop the service
Restart the service
Description:
Bonjour allows applications like iTunes and Safari to advertise and discover services on the local network. Having Bonjour running enables you to connect to hardware devices like Apple TV and software services like iTunes sharing and AirTunes. If you disable Bonjour, any network service that explicitly depends on it will fail to start.
Name
Description
Status
Startup Type
Log On As
Adobe Version Cue CS3 — Adobe Version Cue CS3 — Manual — Local Service
Agere Modem Call Progress Audio — Started — Automatic — Local System
Andrea ADI Filters Service — Started — Automatic — Local System
Apple Mobile Device — Provides the interface to A... — Started — Automatic — Local System
Application Experience — Processes application com... — Started — Automatic — Local System
Application Information — Facilitates the running of in... — Started — Manual — Local System
Application Layer Gateway Service — Provides support for 3rd pa... — Manual — Local Service
Application Management — Processes installation, rem... — Manual — Local System
ASP.NET State Service — Provides support for out-of... — Manual — Network Service
Background Intelligent Transfer Service — Transfers files in the backgr... — Started — Automatic (D... — Local System
Base Filtering Engine — The Base Filtering Engine (... — Started — Automatic — Local Service
Block Level Backup Engine Service — Engine to perform block le... — Manual — Local System
Bluetooth Support Service — Started — Automatic — Local Service
Bonjour Service — Bonjour allows application... — Started — Automatic — Local System
Certificate Propagation — Propagates certificates fro... — Manual — Local System
CNG Key Isolation — The CNG key isolation servi... — Started — Manual — Local System
COM+ Event System — Supports System Event Not... — Started — Automatic — Local Service
COM+ System Application — Manages the configuration... — Manual — Local System
Computer Browser — Maintains an updated list o... — Started — Automatic — Local System
Contour Shuttle Device Engine — Started — Automatic — Local System
Cryptographic Services — Provides four management... — Started — Automatic — Network Service
DCOM Server Process Launcher — Provides launch functionali... — Started — Automatic — Local System
Desktop Window Manager Session Mana... — Provides Desktop Window ... — Started — Automatic — Local System
DFS Replication — Enables you to synchronize... — Manual — Local System
DHCP Client — Registers and updates IP ad... — Started — Automatic — Local Service
Diagnostic Policy Service — The Diagnostic Policy Servi... — Started — Automatic — Local Service
Diagnostic Service Host — The Diagnostic Service Hos... — Manual — Local Service
Diagnostic System Host — The Diagnostic System Hos... — Started — Manual — Local System
Distributed Link Tracking Client — Maintains links between N... — Started — Automatic — Local System
Distributed Transaction Coordinator — Coordinates transactions t... — Manual — Network Service
DNS Client — The DNS Client service (dn... — Started — Automatic — Network Service
Extensible Authentication Protocol — The Extensible Authenticati... — Started — Manual — Local System
Extended
Standard

   If the Apple Bonjour Service is not listed, then it will have to be installed on the computer. First check that either Tobii Studio or the Tobii Eye Tracking Tools are installed on the computer, open the **All Programs** folder in your Windows **Start** menu:

   1. If a folder named **Tobii** containing the **Tobii Eyetracker Browser** is present in the **All Programs** folder, then at least one of the two is installed. If that is the case, download and install the latest version of the Apple Bonjour Service from: http://www.apple.com/support/downloads/bonjourforwindows.html

   2. If the **Tobii** folder is missing from the **All Programs** folder, then re-install Tobii Studio or the Tobii Eyetracker Browser on the computer.

2. **The Apple Bonjour Service is installed but not started.**

   Open the **Windows Control Panel** (**Classic View**) > **Administrative Tools** > **Services**.

   Check in the **Services** list if the **Apple Bonjour Service's Status** is set to **Started**. If the **Status** is empty then right click on it and select **Start**. Restart any Tobii applications and connect again.

3. **The Apple Bonjour Service cannot be started.**

   Most likely the service is blocked by an anti-virus software or Group Policy. Check any Group Policies and anti-virus software installed (not only running) on the computer. If you do not know how to do this, please contact your IT administrator as the procedure differs between security applications.

4. **The Apple Bonjour Service is up and running but there is still no connection.**

   Check that the port Apple Bonjour Service uses to scan the network is not blocked by any firewall. It uses UDP port 5353. If you need help in doing this, please contact your IT administrator as the procedure for doing this differs between security applications.

5. **If none of the above works.**

   If the computer is not connected to the Internet and Skype is running, Skype will flood all network connections in attempts to connect to the Skype servers. This can cause problems with the eye tracker connection. Turn off Skype.

6. **The eye tracker takes a long time to start tracking.**

   If the eye tracker shows a delay of 10-30 seconds when showing the track status, starting a calibration or starting a recording, try to upgrade the Apple Bonjour Service to its most recent version (see point 1). Using an outdated version of the Apple Bonjour Services may cause slow connection problems.

Problems with the peer-to-peer network configuration

When the eye tracker is connected directly to the test computer it uses a network connection with a DHCP server.

Check if the network card is set to obtain an IP address automatically (see pages 8-10 of this manual).

Tobii Support contact:

SWEDEN/GLOBAL
+46 8 522 950 10 Phone
support@tobii.com
www.tobii.com
Support hours: 9 am - 5 pm
(Central European Time, GMT+1)

GERMANY
+49 69 2475 034-27 Phone
support@tobii.com
www.tobii.com
Support hours: 9 am - 5 pm
(Central European Time, GMT+1)

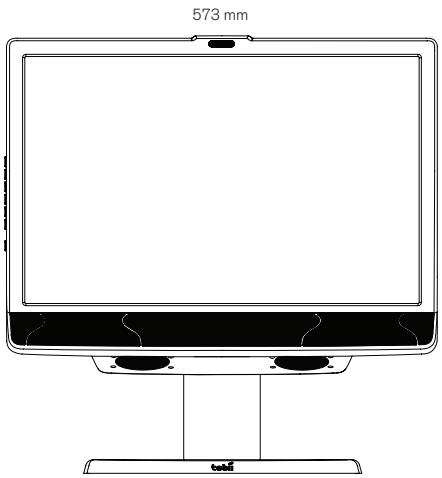
NORTH AMERICA
+1 703 738 1320 Phone
support.us@tobii.com
www.tobii.com
Support hours: 8 am - 5 pm
(US Eastern Standard Time, GMT-6)

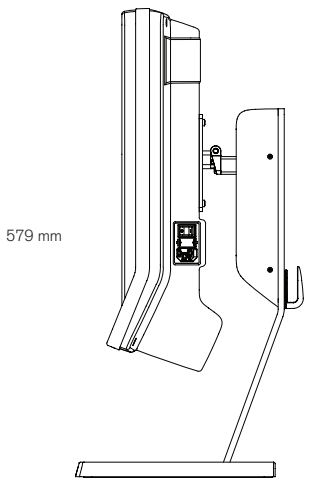
JAPAN
+81-3-5793-3316 Phone
support.jp@tobii.com
www.tobii.co.jp
Support hours: 9 am - 5.30 pm
(GMT+9)

Appendix III
Technical Specifications

Tobii T60 XL Eye Tracker

Mechanical measurements





Model	T60 XL
Data rate	60 Hz
Accuracy	typical 0.5 degrees
Drift	typical 0.1 degrees
Spatial resolution	typical 0.35 degrees
Head movement error	typical 0.2 degrees
Head movement box	44 x 22 cm at 70 cm
Tracking distance	50-80 cm
Max gaze angles	42 degrees
Top head-motion speed	25 cm/second
Latency	maximum 33 ms
Time to tracking recovery	typical 300 ms
Weight (excluding case)	~ 13 kg / 29 lbs
Eye tracking technique	both bright and dark pupil tracking
Eye tracking server	Embedded
Screen size	24" TFT
Screen resolution (Max)	1080p (1920 x 1200 pixels)
Display colors	16.7 M (true 8-bit)
Vertical sync frequency	46-63 Hz
Horizontal sync frequency	69-78.5 kHz
TFT response time	4 ms
User camera	Built in, frame rate 640 x 480@ 30 fps
Speakers	Built in, 2 x 4W power
Connectors	LAN, VGA, DVI-D, S-Video, CVBS video, Power, User Camera and Audio

Average values over the screen measured at a distance of 63 cm in a controlled office environment.

Glossary - technical specifications

Data rate	Number of sampled gaze points per second. The Tobii T60 XL has a stable data-rate of 60 Hz; that is 60 gaze data points per second are collected for each eye.
Accuracy	The typical difference between the Measured Gaze Direction and the Actual Gaze Direction at different parts of the screen for a person positioned at the centre of the eye tracking box. This does not include drift effects and compensation errors from larger head movements. The accuracy of the Tobii eye trackers varies depending on external conditions such as lighting, quality of the calibrations, and individual eye characteristics.
Drift	Change in accuracy due to change in lighting. The specified value relates to complete inversion of screen color, e.g from black to white without recalibration in between.
Spatial resolution	The term “spatial resolution”, or “noise”, denotes the frame-to-frame variation of the measured gaze point.
Head movement error	Decrease of accuracy at the edges of the eye-tracking box as compared to the centre where the calibration was done. This includes head translations sideways as well as movement back and forth and up and down. The value is an average of the two types of translations.
Head movement box	Measures the box (height × width in cm) where at least one of the eyes is within the field of view of the eye tracker (the present value was measured at 70 cm distance from the sensor).
Tracking distance	The distances to the sensor within which the eye tracker is able to detect at least one of the eyes.
Max gaze angles	Maximum gaze angle that the eye tracker can detect at least one pupil. The angle is calculated from the centre of the sensor.
Top head-motion speed	The maximum speed that a user can move the head at which the eye tracker is able to still find at least one pupil.
Latency	Is calculated from the time when an image was shot to when a valid gaze point is delivered to an eye tracking application there is a certain delay. This delay is caused both by sensor hardware and by the computation of the eye tracking software algorithms. Since the timestamp is set at exposure, such delay does not affect the accuracy of the timestamp.
Time to tracking recovery	An eye tracker working in a natural user environment often loses track of the eyes of the user, for example, when the user is blinking, looking down to type, or when the user completely turns away from the tracker. This measure represents the typical time from tracking failure to when the eye tracker finds the eyes again.
Eye tracking technique	The Tobii Eye Trackers use two different techniques to determine eye position: 1. Bright pupil eye tracking, where an illuminator is placed close to the optical axis of the imaging device, and causes the pupil to appear lit up (this is the same phenomenon that causes red eyes in photos). And 2. Dark pupil eye tracking where the illuminator is placed away from the optical axis causing the pupil to appear black.
Eye tracking server	Gaze data calculations are performed by firmware embedded in the eye tracker. Different applications can be connected as clients to the eye tracker system over a LAN connector to gather eye gaze data and other data in real-time and to perform calibrations and other actions.

Eye tracker data output

Different applications can be connected as clients to the eye tracker system over TCP/IP (LAN connector) to gather eye gaze data in real-time and to perform calibrations (and other actions). Examples of applications that can be used together with the eye tracker include the Tobii Studio™ analysis software, third party analysis products such as E-Prime, or your own custom written software for analysis, gaze-contingent applications, or eye control applications. For more information on how to create your own applications, please refer to the Tobii Software Development Kit (SDK) product description.

Below you can find a list of all data that can be accessed through the output of the eye tracker. In Tobii Studio™ analysis software this data can be accessed through a Raw data text export function, and easily imported into a spreadsheet for further analysis.

Timestamp	Timestamp in milliseconds for when the gaze data was collected
Gaze PointXLeft	Horizontal screen position of the gaze point for the left eye
GazePointYLeft	Vertical screen position of the gaze point for the left eye
CamXLeft	Horizontal location of the left pupil in the camera image (0 is left edge, 1 is right edge)
CamYLeft	Vertical location of the left pupil in the camera image (0 is top, 1 is bottom)
DistanceLeft	Distance from the eye tracker to the left eye. The distance is given in mm on a straight axis right out from the eye tracker plane
PupilLeft	Size of the pupil (left eye) in mm. The distance and pupil size measures are calculated to be as close to real values as possible. However, individual differences in the eyes of subjects and the strength of glasses/contact lenses will cause errors in these values. The measures still reflect changes in head position and pupil size accurately.
ValidityLeft	Validity of the gaze data. The validity is 0 if the eye is found and the tracking quality good. If the eye cannot be found by the eye tracker the validity code will be 4. Read more under the Validity codes section further down
Gaze PointXRight	The horizontal screen position of the gaze point for the right eye
GazePointYRight	Vertical screen position of the gaze point for the right eye
CamXRight	Horizontal location of the right pupil in the camera image (0 is left edge, 1 is right edge)
CamYRight	Vertical location of the right pupil in the camera image (0 is top, 1 is bottom)
DistanceRight	Distance from the eye tracker to the right eye. The distance is given in mm on a straight axis right out from the eye tracker plane
PupilRight	Size of the pupil (right eye) in mm. The distance and pupil size measures are calculated to be as close to real values as possible. However, individual differences in the eyes of subjects and the strength of glasses/contact lenses will cause errors in these values. However, the measures still reflect changes in head position and pupil size accurately
ValidityRight	Validity of the gaze data. The validity is 0 if the eye is found and the tracking quality good. If the eye cannot be found by the eye tracker the validity code will be 4. The value is for the right eye. Read more under the Validity codes section further down

Additional data available in the Tobii Studio Raw Data Export

DateTimeStamp	Timestamp recalculated using the computer date time, shown in hours, minutes, seconds and milliseconds (hh:mm:ss:ms)
DateTimeStampStartOffset	Timestamp converted into hh:mm:ss format. The start time for the recording is also shown in the Replay and Visualization views in Tobii Studio if the option Show Date is selected in the Recordings field.
Number	Timestamps in numbered order
FixationIndex	Indexes for the fixation points (values correspond to the order of the fixation).
GazePointX	Gaze PointX can be the horizontal screen position for either eye or the average for both eyes. The value to show here is specified in Tobii Studio. This value is also used for the fixation definition.
GazePointY	GazePointY can be the horizontal screen position for either eye or the average for both eyes. The value to show here is specified in Tobii Studio. This value is also used for the fixation definition.
Event	Events, automatic and logged, will show up under Events. The automatic events are start and end events for the different media, mouse clicks and key presses. The automatic events are listed in the event table under Event Key and Data. The logged events are the manually logged events entered either in the replay view or from the remote logger
EventKey	Unique event key is shown for different key presses.
Data1	Data field for the event. The contents of this field vary depending on what type of event this is.
Data2	Data field for the event. The contents of this field vary depending on what type of event this is.
Descriptor	Description of the event. The contents vary depending on what type of event this is.
StimuliName	The file name of the media given in the setup in Tobii Studio
MediaWidth	Media size in pixels
MediaHeight	Media size in pixels
MediaPosX	Distance from the left side of the screen to the media on the screen given in pixels
MediaPosY	Distance from the top of the screen to the media on the screen given in pixels
MappedFixationPointX	X coordinate for the fixation point mapped to the media coordinate system, where the origin for the coordinate system is the top left corner of the image/media
MappedFixationPointY	Y coordinate for the fixation point mapped to the media coordinate system, where the origin for the coordinate system is the top left corner of the image/media
FixationDuration	Fixation duration. The time in milliseconds that a fixation lasts
AoiIds	ID number for the AOI, usually a counter starting at zero for the first AOI
AoiNames	Name of the AOI or AOIs if fixations on multiple AOIs are to be written on the same row
WebGroupImage	Filename of the image file that is used to visualize the web group
MappedGazeDataPointX	X coordinate for the raw gaze data point mapped to the media coordinate system where the origin for the coordinate system is the top left corner of the image/media
MappedGazeDataPointY	Y coordinate for the raw gaze data point mapped to the media coordinate system where the origin for the coordinate system is the top left corner of the image/media
MicroSecondTimestamp	Timestamp for this export row in microseconds
ValidityCodes	Validity code for each data point. This code is is based on whether the system is able to identify correctly both eyes. It is recommended that the validity codes should always be used for data filtering, to remove data points that are obviously incorrect.

Tobii_UserManual_TobiiT60XLEyeTrackerUserManual_24012011_ENGus

Tobii Support contact:

SWEDEN/GLOBAL
+46 8 522 950 10 Phone
support@tobii.com
www.tobii.com
Support hours: 9 am - 5 pm
(Central European Time, GMT+1)

GERMANY
+49 69 2475 034-27 Phone
support@tobii.com
www.tobii.com
Support hours: 9 am - 5 pm
(Central European Time, GMT+1)

NORTH AMERICA
+1 703 738 1320 Phone
support.us@tobii.com
www.tobii.com
Support hours: 8 am - 5 pm
(US Eastern Standard Time, GMT-6)

JAPAN
+81-3-5793-3316 Phone
support.jp@tobii.com
www.tobii.co.jp
Support hours: 9 am - 5.30 pm
(GMT+9)

© Tobii®. Illustrations and specifications do not necessarily apply to products and services offered in each local market. Technical specifications are subject to change without prior notice.
All other trademarks are the property of their respective owners.

HEADQUARTERS, SWEDEN
Tobii Technology AB
Karlsrovägen 2D
Box 743
S-182 17 Danderyd
Sweden
+46 8 663 69 90 Phone
+46 8 30 14 00 Fax
sales@tobii.com

CENTRAL EUROPE
Tobii Technology GmbH
Niedenau 45
D-60325 Frankfurt am Main
Germany
+49 69 24 75 03 40 Phone
+49 69 24 75 03 429 Fax
sales.de@tobii.com

NORTH AMERICA
Tobii Technology, Inc.
510 N. Washington Street
Suite 200 - Falls Church, VA
22046 - USA
+1-703-738-1300 Phone
+1-888-898-6244 Phone
+1-703-738-1313 Fax
sales.us@tobii.com

JAPAN
Tobii Technology, Ltd.
3-4-13 Takanawa, Minato-ku
Tokyo 108-0074
Japan
+81-3-5793-3316 Phone
+81-3-5793-3317 Fax
sales.jp@tobii.com

CHINA
Tobii Electronics Technology
Suzhou Co., Ltd
No. 678, Fengting Avenue
Land Industrial Park
Weiting, Suzhou
Post code: 215122
China
+86 13585980539 Phone
sales.cn@tobii.com

tobii
www.tobii.com